Energy Consumption of Irrigation Controllers

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Project Summary

- LBNL metered power use of irrigation controllers as part of PIER-funded project investigating “builder-installed miscellaneous” equipment
- Original purpose of this project was to provide homebuilders with information to choose more energy efficient equipment
- Irrigation controllers were one of several products analyzed

Sample Selection

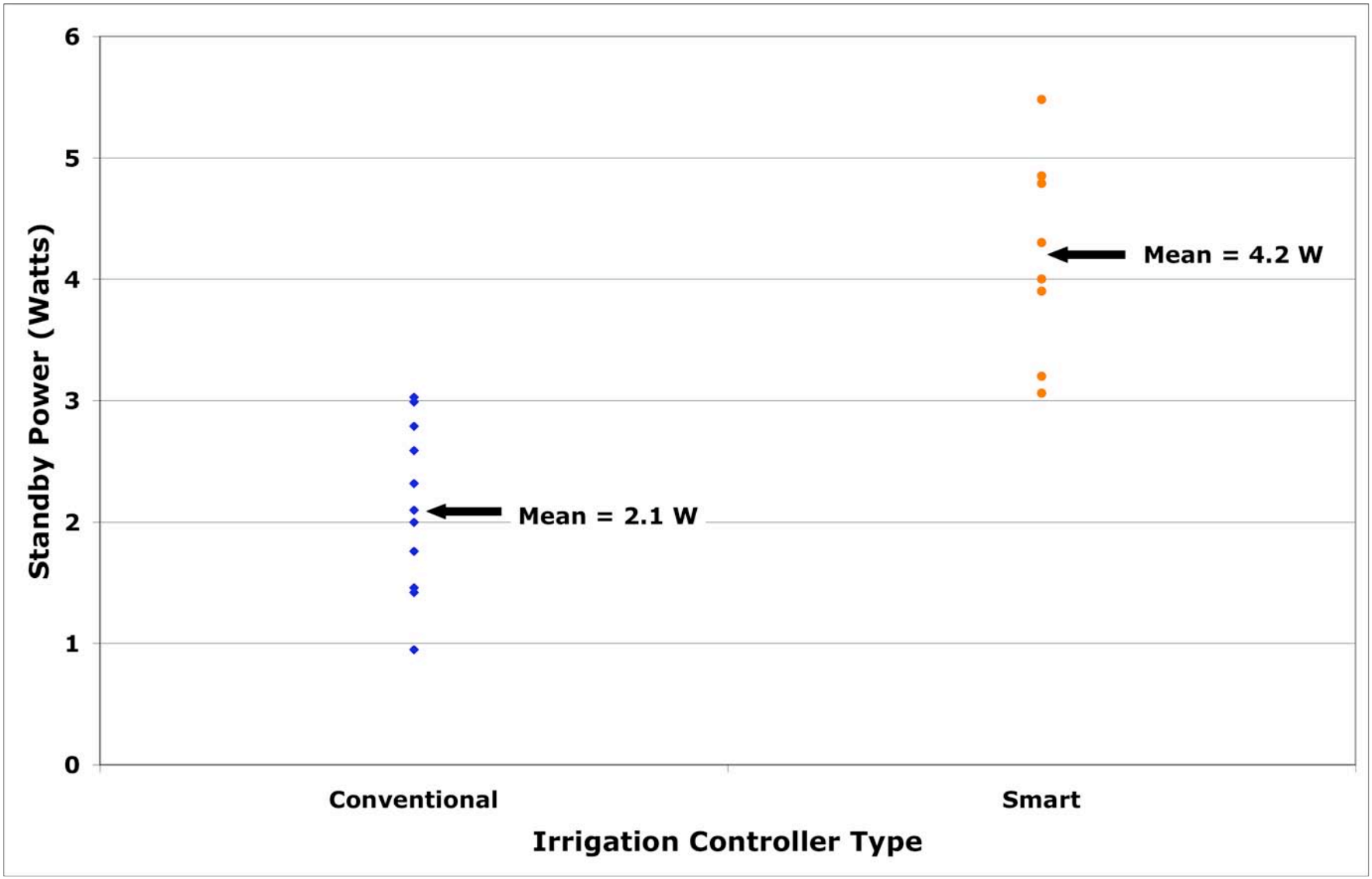
- Most units measured in water conservation offices
  - — Contra Costa Water Department (CCWD)
  - — East Bay Municipal Utility District (EBMUD)
  - — Sample units available for consumer information
- Metered 11 conventional and 8 smart controllers, representing 12 manufacturers
- Mainly residential controllers
- Some models were a few years old

Power Measurement

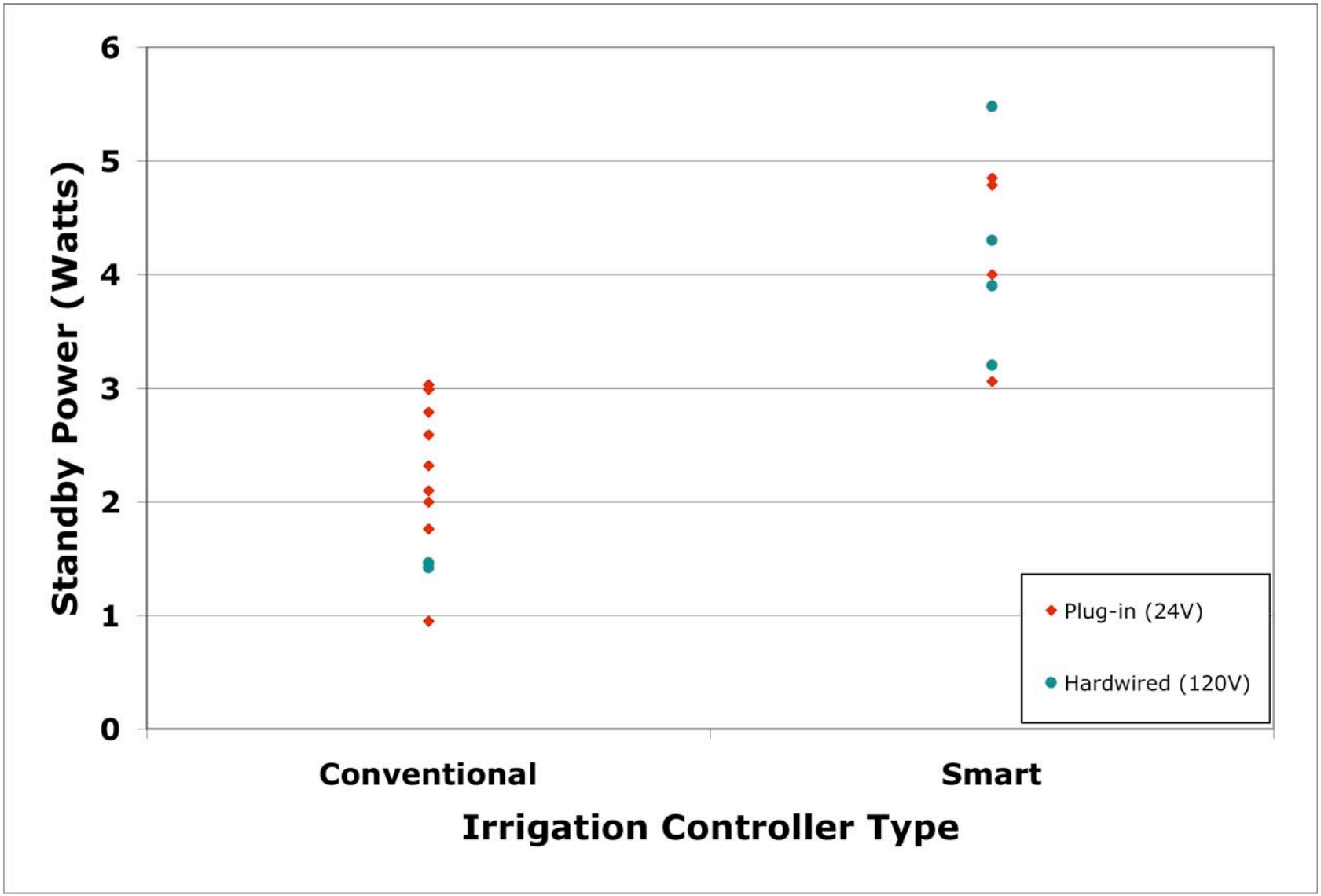
- Used plug-in meter
- Accurate at low power
- Spot measurements (no usage patterns)

- "Standby" readings are with the controller ON but not activating an irrigation solenoid; no external sensors connected
- "Active" readings are with the controller activating an irrigation solenoid (only collected active for 4 units)
- Standby mode is ~90% of annual energy use

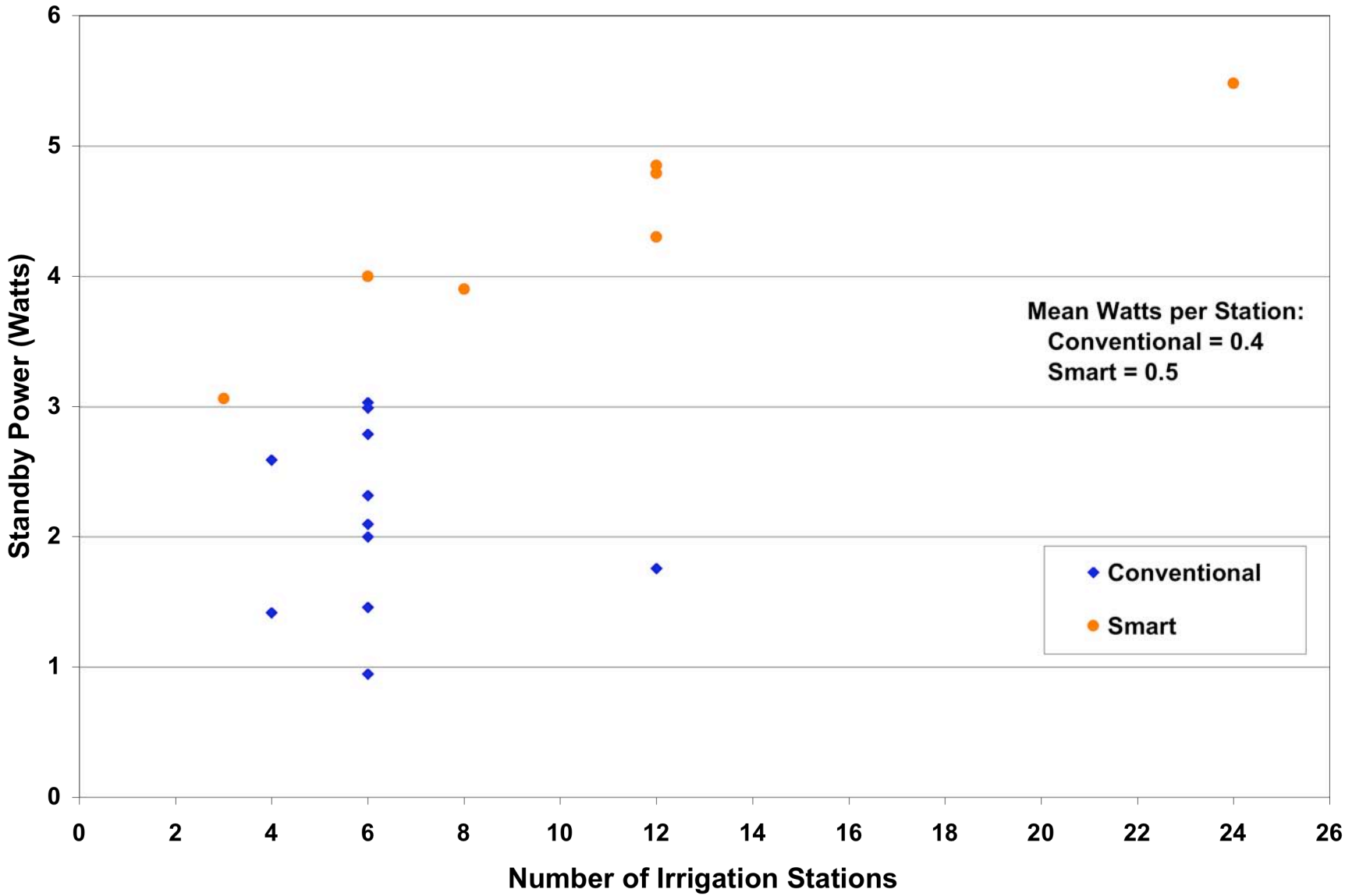
Smart Controllers Have Higher Standby Power



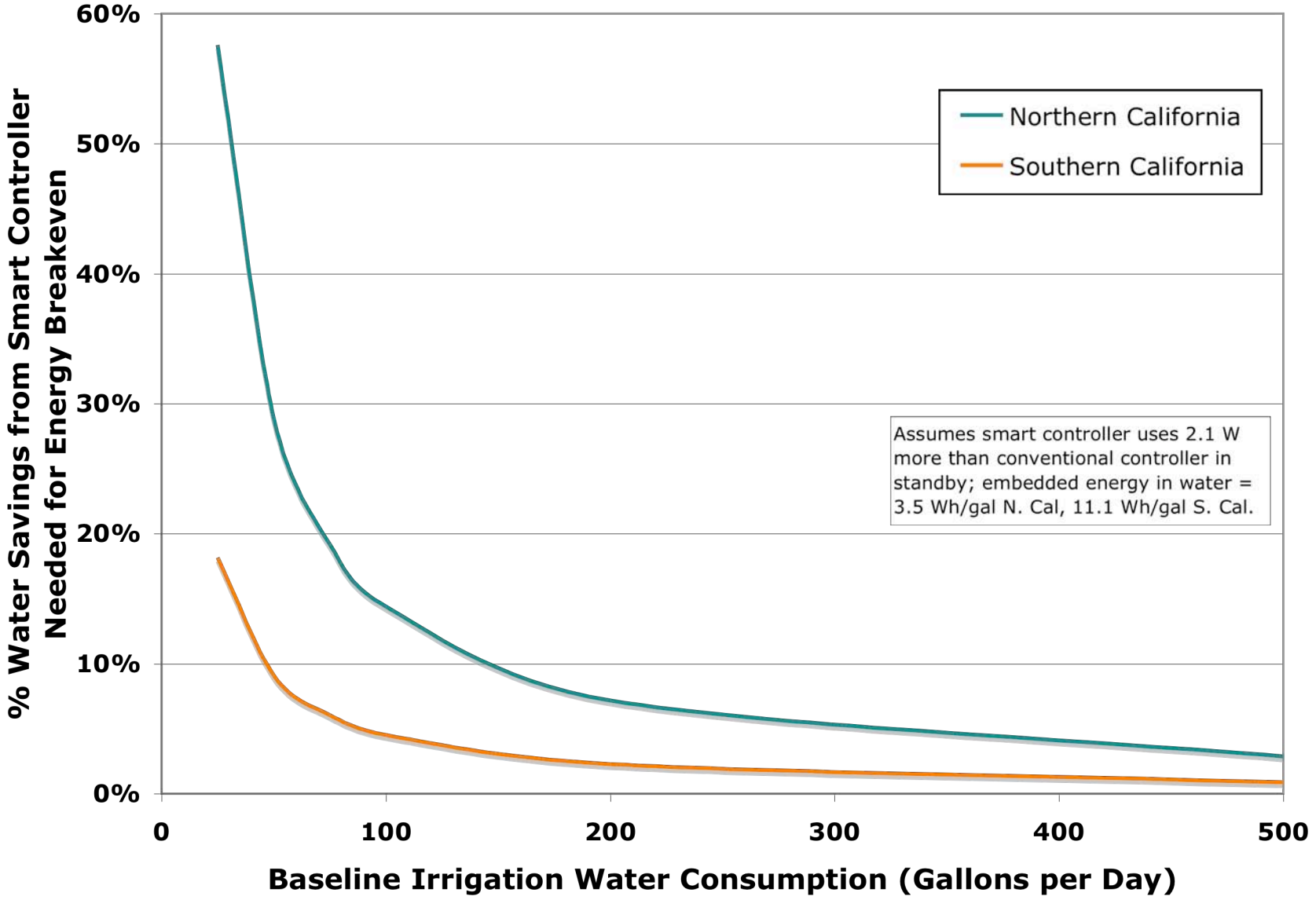
Does Type of Transformer Affect Standby Power?



Does Number of Irrigation Stations Affect Standby Power?



Can Embedded Energy in Saved Water Offset Higher Standby Power?



Study Conclusions

- **Smart controllers have higher standby power**
- **For all controllers, standby mode is ~90% of annual energy consumption**
- **Transformer type and number of stations do not obviously affect standby power**
- **Water savings can offset increased standby power, but depends on irrigation use and location**

Other Observations

- Smart controllers need to be operated properly to achieve water savings (similar to programmable thermostats)
  - — May need user interface and usability standards
- Network connections (Wi-Fi, Ethernet) increase energy use
  - — Standards being developed to allow devices (e.g., smart controllers) to remain network-connected in low-power modes

Thank You

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